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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/816,627 | 04/02/2004 | Rozalia Beica | 51833 | 1069 |

7590 01/12/2006

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EXAMINER

NOVACEK, CHRISTY L

ART UNIT PAPER NUMBER

2822

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|---------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/816,627 | Applicant(s) BEICA ET AL. | |
| | Examiner Christy L. Novacek | Art Unit 2822 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11/2/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the communication filed April 2, 2004.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5 and 7-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Egli (US 20030226758).

Regarding claim 1, Egli discloses an electrolyte composition for depositing a tin alloy on the substrate including tin ions, ions of one or more alloying metals, and acid, a thiourea derivative, and additives that may include an alkoxyated aromatic alcohol and/or a polyethylene imine (para. 0029-0039).

Regarding claims 2-4, 12 and 13, Egli discloses that the ions of the alloying metals can be silver, copper, and/or bismuth (para. 0029).

Regarding claims 5 and 14, Egli discloses that the thiourea derivative can be tetramethyl thiourea (inherently 1,1,3,3-tetramethyl-2-thiourea) (para. 0034).

Regarding claim 7, Egli discloses that the additive may be a polyethylene imine (para. 0034).

Art Unit: 2822

Regarding claim 8, Egli discloses that the additive may be an alkoxylated aromatic alcohol (ethoxylated beta naphthol) (para. 0038).

Regarding claim 9, Egli discloses that the electrolyte composition may further include an antioxidant compound (para. 0039).

Regarding claim 10, Egli discloses contacting the substrate with the electrolyte composition and passing a current through the electrolyte composition to deposit the tin alloy on the substrate (para. 0030).

Regarding claim 11, Egli discloses the substrate is an electronic component such as lead frames, semiconductor packages, components, connectors, contacts, chip capacitors, chip resistors and printed wiring boards (para. 0052).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Egli (US 20030226758) in view of Egli (US 6,706,418).

Regarding claim 6, Egli ('758) does not disclose using an additive of an alkanol amine. Egli ('758) does teach using a reducing agent and states, "Suitable reducing agents include, but are not limited to, hydroquinone and hydroxylated aromatic compounds, such as resorcinol, catechol, and the like." Like Egli ('758), Egli ('418) discloses an electrolyte composition for

Art Unit: 2822

depositing a tin alloy on the substrate including tin ions, ions of one or more alloying metals, an acid a reducing agent. Egli ('418) teaches that a suitable reducing agent is an alkanol amine (col. 6, ln. 45-49). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use an alkanol amine for the reducing agent of Egli ('758) because Egli ('418) teaches that an alkanol amine is an art-recognized equivalent of a reducing agent when electroplating a tin alloy onto a substrate.

Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Egli (US 20030226758) in view of Matsuki et al. (US 6,666,369).

Regarding claim 15, Egli discloses that the tin electrolyte composition is particularly suitable for depositing a tin or tin-alloy layer on an electronic device substrate (para. 0052). Egli does not specifically disclose using the tin electrolyte composition to deposit a tin layer used as an interconnect bump. Like Egli, Matsuki discloses a process of electroplating a tin alloy solder material onto an electronic component substrate. Matsuki teaches that the electronic component substrate may include a semiconductor die (1) having a plurality of interconnect bump pads (3), a seed layer over the interconnect pads (5), a tin-alloy interconnect bump layer (6) over the interconnect bump pads formed by passing a current through an electrolyte composition to deposit the tin-alloy interconnect bump layer and reflowing the interconnect bump layer (col. 8, ln. 7-41; col. 29, ln. 26-31). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the electrolyte composition of Egli to deposit the interconnect bumps of Matsuki because Matsuki does not disclose any particular electrolyte composition and Egli discloses an electrolyte composition that can successfully electroplate tin-alloy interconnect bumps onto an electronic component substrate.

Regarding claims 16 -18, Egli discloses that the ions of the alloying metals can be silver, copper, and/or bismuth (para. 0029).

Regarding claim 19, Egli discloses that the thiourea derivative can be tetramethyl thiourea (inherently 1,1,3,3-tetramethyl-2-thiourea) (para. 0034).

Regarding claim 20, Egli discloses that the additive may be a polyethylene imine (para. 0034).

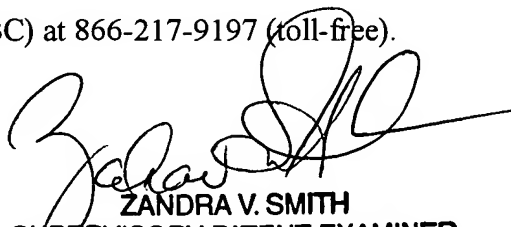
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN
January 9, 2006


ZANDRA V. SMITH
SUPERVISORY PATENT EXAMINER